U.S. Department of Homeland Security

United States Coast Guard

LOGISTICS ELEMENT MANAGER'S (LEM) DESK GUIDE

COMDTINST M4105.11

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United States Coast Guard

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Subj: **LOGISTICS ELEMENT MANAGER'S (LEM) DESK GUIDE**

Ref: (a) System Integrated Logistics Support (SILS) Policy Manual, COMDTINST M4105.8 (series)
(b) Major Systems Acquisition Manual, COMDTINST M4150.2 (series)

1. **PURPOSE**. To prescribe procedures and provide guidance for Logistics Element Managers, logisticians, and other acquisition professionals.

2. **ACTION**. All Managers shall ensure this desk guide is provided to all persons identified in the Purpose, above. All LEMs responsible for purchasing or supporting Coast Guard assets, systems and or equipment must follow the guidance of this desk guide. Internet release authorized.

3. **DIRECTIVES AFFECTED**. None.

4. **BACKGROUND**. This desk guide is a result of a need identified by the Infrastructure Transition Natural Working Group, whose task was to determine why Coast Guard logistics support of equipment was often incomplete, and why the transition from the acquisition office to the support community was often unsuccessfully developed or transferred. One of the working group's recommendations was to better train acquisition personnel, specifically Logistics Element Managers (LEMs), by developing a desk guide that clearly and simply explains logistics and acquisition processes. This document is the outcome of that recommendation. Specialized acquisition training is available to all acquisition team

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members, but no specialized training exists for LEMs and their responsibilities. References (a) and (b) establish the roles and responsibilities of LEMs and Integrated Logistics Support Management Teams (ILSMT) during acquisition and sustainment.

5. **DISCUSSION**. This desk guide is designed to educate current and future LEMs, ILSMT members, and the rest of the acquisition community in the Coast Guard's logistics and acquisition processes. It is designed to complement references (a) and (b). It explains the logistics and acquisition processes in simple terms so that even individuals without technical knowledge can understand how it works. Other supporting disciplines that impact logistics and acquisition, such as funding and contracting, are also explained. Anyone responsible for purchasing or supporting Coast Guard equipment, such as LEMs and ILSMT members, will be provided a copy of this document.

6. **REVISIONS**. Recommendations for improvements to this desk guide shall be submitted to Commandant, Logistics Program Management Division (CG-441).

7. **ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS**. Environmental considerations were examined in the development of this guide, and have been determined to be not applicable.

8. **FORMS/REPORTS**. None.

/s/
D. G. GABEL
Rear Admiral, U.S. Coast Guard
Assistant Commandant for Engineering and Logistics

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INTRODUCTION

A. **General**. This desk guide is designed to inform Logistics Element Managers (LEMs), Integrated Logistics Support Management Team (ILSMT) members, and other individuals of the Coast Guard's logistics lifecycle process and its impact on the acquisition process, the LEMs roles and responsibilities, and the offices and policy in the Coast Guard. This desk guide shall be made available to each new LEM as a ready reference. It does not replace existing Commandant Instructions, but does provide process amplification and a general overview of logistics as an integral part of the systems engineering process (see Appendix B for policy documents).

B. **Applicability**. The information contained herein is applicable to all types of material and automated information systems and all acquisition strategies. Unfortunately, the depth and scope of each project/system varies so significantly that one process may not satisfy all acquisition strategies. The examples and points cited are meant to help shape your overall thought process. New LEMs are encouraged to develop their knowledge and expertise in logistics and acquisition by taking classes offered by the Coast Guard and the Department of Defense (see Chapter 13 for recommendations). Logistics is a highly dynamic discipline of new ideas and processes, so LEMs must actively seek opportunities to further their professional education.

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CHAPTER 1. LOGISTICS DEFINED

A. **Purpose of Logistics**. Logistics, or more broadly Integrated Logistics Support (ILS) or Life Cycle Logistics Support, is the coordinated management and application of all the logistics elements needed for successful operational performance and maintenance of a system or equipment through its entire lifetime, including disposal. The purpose of logistics is to sustain equipment and items owned by the Coast Guard. This is accomplished by influencing the design of a system in such a way as to make system operation, maintenance and sustainment effective and affordable, and create a complete support system for the end item, including all the support elements necessary for fielding. In other words, logisticians work with the design engineers to ensure the new item is easy to repair, that all aspects of support are planned for (training, test equipment, shore facilities, onboard spares, shore based spares, maintenance, etc.), and finally, that these plans are funded and carried out so that when the first end item is fielded, all the support infrastructure is in place and working, and operators are trained and provided with all necessary tools required. If done well, the logistics process should create a support infrastructure that will operate effectively at the lowest possible cost, and provide the user with the resources necessary to maintain the system in the field over the long term. Logistics is a multi-functional, technical management discipline associated with the design, development, testing, production, fielding, maintenance, sustainment, and improvement of cost effective systems that achieve the user's readiness requirements. During acquisition, an initial sustained support capability is established for a new system or equipment that is being introduced into the Coast Guard inventory. This sustained support capability is then maintained and modified to meet changing requirements, for the entire life of the system or equipment.

B. **Technical and Management**. Logistics is both a technical and management activity. Technical aspects include knowledge and experience of each of the ten logistics elements and how they work, as well as other related disciplines. For example, in Packaging, Handling, Storage and Transportation, it is important to know the latest in packaging materials, the various types of forklifts and inventory handling equipment, warehouse inventory management, and the various methods to move items across the country or around the world. The management aspect is in the research, planning and execution of the logistics concept. Each aspect of the concept, such as a maintenance plan, when executed, has to be managed by a logistician, in partnership with the contractor and Coast Guard activities, to ensure all tasks in the plan are completed on time and to high standards. It is vitally important that system developers evaluate the potential operation and support costs of alternate designs, and factor these into early design decisions. Logistics is most effective when it is integrated into both the contractor's and Government's system engineering and technical management process. In this way, system designers, logisticians, and project managers are best able to identify, consider, and "trade off" support considerations with system cost, schedule, and performance drivers. This should result in an optimum balance of system requirements that meet both the users operational and readiness requirements at an affordable price.

C. **Primary Areas**. Logistics is divided into two primary areas, Strategic and Applied Logistics. Applied logistics encompasses the logistics for a particular system or platform, and is divided into two phases. Phase 1, commonly referred to as Acquisition Logistics or Logistics Engineering, includes everything that is done to plan and acquire support before a system is delivered to the user. Phase 2, the "Sustainment Phase", commonly referred to as Tactical/Operational Logistics or Product Support, are tasks that are done to support the system while it is being used. Actions that occur during Phase 1 dictate how well the system will be supported in phase two. Acquisition Logistics, at its best, requires a "problem prevention" mentality. Operational Logistics generally needs a "problem solving" mentality. Strategic Logistics is the most unexplored area of logistics. It is defined as the art and science of harnessing the economic and societal strengths of a nation. Strategic Logistics is focused on the process of planning for, coordinating, and allocating the manpower, material, infrastructure, and services required. Performing strategic logistics requires coordination between the executive and legislative branches, state governments, and industry, to define the industrial base and resources of a country (both military & civilian). Strategic Logistics generally requires a "strategic thinking" mentality – someone who sees the "broadest picture".

D. **Goal of Lifecycle Logistics**. The goal or end state of lifecycle logistics is logistics supportability of a system or equipment item during sustained operation by the Coast Guard. The basic "deliverables" of lifecycle logistics may include Cost-Benefit Analyses, Logistics Plans, and Support Analyses. Each logistics element produces a plan describing how and by whom that facet of logistics support will be developed, executed and supported. Plans are then used to establish logistics infrastructure, procure materials, and develop support processes. Logistics Plans are living documents and are refined and modified as necessary, over the entire life cycle of the asset, system or equipment, based on past experience and to accommodate new or changing operational and/or support requirements.

E. **ILS Concepts**. There are three important overall concepts that drive ILS. The first is that decisions made during the design phase drive the design of the support process, its efficiency, and total life-cycle costs. The second is that all ILS elements are connected to one another, and decisions made for one element will likely affect the rest. Finally, the level of readiness desired of a system/equipment is the basis for determining its logistics requirements, including the need for redundancy of systems and equipment, establishment of the maintenance concepts, and the way its performance is measured.

F. **Terminology**. One note about terminology. Many firms, such as trucking, shipping, rail, and parts suppliers, use the term "logistics" to describe what they do. Their version of logistics means moving goods from point to point, or supplying spare parts to equipment users. In the acquisition and support communities, logistics means planning and implementing the planning for the entire spectrum encompassed by the ten logistics elements of Maintenance Planning; Manpower and Personnel; Supply Support; Support and Test Equipment; Technical Data; Performance and Training Support; Facilities, Packaging, Handling, Storage and Transportation; Computer Resources Support; and Design Interface.

CHAPTER 2. THE LOGISTICS ELEMENTS

A. **Logistics Elements Defined**. Logistics is composed of ten elements. As a general rule, a specific analysis is conducted for each element to determine the need to develop logistics element plans. These plans are developed by logisticians and describe in detail how each logistics element will be accomplished throughout the life of the project. Each logistics' element plan is tailored to meet the requirements of the particular acquisition project, and is basically a checklist of factors that should be considered during the acquisition process. Within the Coast Guard, there are offices that have formal responsibility over particular elements, even though these responsibilities are, in practice, shared with other offices. Responsible offices are indicated below. The ten elements are:

1. Maintenance Planning. *(Responsible offices CG-41/CG-45/CG-6).* The process of developing and establishing maintenance, repair and support processes and requirements for the lifetime of the system. It answers questions such as: What can go wrong? Who will fix it? Where will it be fixed? How will it be fixed? When will it be fixed? In the past, a Maintenance Analysis was developed to establish such things as the maintenance process, levels of maintenance, location where it was to take place, and how often it would occur. All of that information was used to develop the Maintenance Plan. Today the Coast Guard uses the Supportability Analysis process (MIL-PRF-49506 and MIL-HDBK-502) which is the current process used with performance based contracts. It is actually a group of related analyses that together provide all necessary maintenance planning information. Supportability analyses include Reliability Analysis to determine how frequently failures are anticipated to occur; Maintainability Analysis to identify how easily and quickly failures can be corrected; Failure Modes and Effects Analysis (FMEA) or Failure Modes, Effects, and Criticality Analysis (FMECA) to determine the modes of failure, the effects on system operation resulting from each failure mode, and (when FMECA is done) the criticality of those resulting effects on the system's capability to perform; Reliability Centered Maintenance (RCM) analysis to identify preventive maintenance actions that will preclude the occurrence of failures which have significant or critical effects on system operation; and Detailed Task Analyses to identify specific procedures for task accomplishment, time required for accomplishment and all resources necessary to accomplish the task. Determination of where maintenance actions will be accomplished is made through Level of Repair Analysis (LORA), or a similar Repair Level Analysis (RLA). The role of the Maintenance LEM is to make sure all such analyses are conducted, if required for that project, and are complete and thorough. The maintenance LEM then oversees the implementation of the recommendations of these analyses as directed by the project logistician.

2. Manpower and Personnel. *(Responsible offices CG-1/CG-45).* Manpower is the process that develops and establishes the number of military and civilian personnel required and potentially available to operate, maintain, sustain and provide performance interventions for systems over the life cycle of the system. Personnel defines the cognitive and physical capabilities required to be able to train for, operate, maintain, and sustain both material and information systems. A Manpower and Personnel Analysis (MPA) is first conducted to identify the numbers, skills and grades required to operate and support the

system, at both peacetime and wartime rates. The MPA is normally a contractor-conducted analysis, directed and funded by the PM, and subsequently reviewed by the responsible office. The MPA shall include shore support requirements. This analysis becomes the basis for the Manpower and Personnel Plan. Logistics efforts shall strive to minimize the numbers and skill levels of personnel required to operate and support the system, since personnel are often a major contributor to system life-cycle cost. Manpower and personnel planning is often included in the Mission Needs Statement at the very start of an acquisition program. Some useful terms are:

a. Manning. The specific inventory of people at an activity in terms of numbers, grades, and occupational groups.
b. Manning Level. The number of personnel at an activity divided by the billets authorized for that activity, stated as a percentage.
c. Billet. The term used for a position with a defined grade, title and skills.
d. Work Year. Also known as Man Year, a way to define the amount of work or effort a project will take to complete using time spent by people as a scale, i.e., "this effort will require three and one-half work years to complete".

3. Supply Support. *(Responsible Activities CG-45/ARSC/ELC).* The process that determines, acquires, catalogs, receives, stores, transfers, issues, and disposes of parts and items necessary to support a system and its support items (such as test equipment, trainers, and simulators) in sufficient quantity to meet the user's needs. When well planned and managed, supply support ensures that the correct amount of material is available, when and where needed, to support maintenance. During acquisition, the process starts with a Supply Support Analysis that forms the basis for a Supply Support Plan. This analysis often includes the identification of the system structure, maintenance coding, maintenance replacement factor development, overhaul rates, roll-up quantities, design change information, associated technical manuals, long lead items, bulk items, tools, and test equipment. It also lays out the list of initial support items that are delivered with the system, called Provisioning Technical Documentation, and the list of follow-on requirements, called Routine Replenishment. Supply support involves ensuring that spares (hardware components and computer software) and repair parts required to operate and maintain a system are provided on a timely basis. Common consumable or expendable items, such as computer paper, batteries, and printer cartridges, are also included here. Systems Engineering and Logistics efforts strive to reduce the variety of spare parts and maximize the standardization of parts used in end items and support items. This simplifies the supply problem and maintenance requirements.

4. Support and Test Equipment**.** *(Responsible Activities ARSC/ELC/CG-6/CG-45/MLCs).* Support and test equipment is the term applied to all equipment (mobile or fixed) required to support the operation and maintenance of the system. The four types of Support and Test Equipment are:

a. Ground Handling and Maintenance Equipment. Includes all equipment required to keep a system or equipment operational in its environment (e.g., implements, tools, engine starting units).

b. Tools, Jigs, and Fixtures. Includes portable and transportable tools, hoists, jigs, conveyors, guide rails, slings, cradles, dollies, monorails, carts, chain falls, and reels.

c. Miniature/Micro miniature Repair Kits. Special repair kits provided to designated units. Consist of tools and equipment to perform normal and emergency repair of printed circuit boards and other assembly-mounted miniature electronics such as motors, synchros, and timers.

d. Test, Measurement, and Diagnostic Equipment. Any system or device used to evaluate the operating condition of a system, or equipment to identify or isolate actual or potential malfunctions. There are four subtypes; Electronic Test Equipment (Automatic and Non-Automatic), Electrical Test Equipment, Mechanical Test Instrumentation, and Metrology and Calibration Equipment. This logistics element includes the acquisition of logistics support for the support and test equipment itself. A Support and Test Equipment Analysis is performed initially to determine the support and test equipment necessary to maintain the system. This analysis becomes the basis of the Support and Test Equipment Plan. Logistics efforts should strive to reduce the number of tools and support equipment required to maintain a system, especially those that must be carried onboard ships or aircraft. Standardization should also be a prime consideration when choosing support and test equipment.

5. Technical Data. *(Responsible Activities ARSC/ELC/CG-45).* Technical data is scientific or technical information, recorded on any form or medium, necessary to operate and maintain a system or equipment. Technical data consists of drawings and associated parts lists, specifications, technical manuals, operator and maintainer manuals, Provisioning Technical Documentation (PTD), Engineering Data for Provisioning (EDFP), manufacturing data, technical reports, and Catalog Item Identifications.

   a. Technical Data Documentation. Computer programs and related software are not technical data since they are part of the system rather than data about the system. They instead fall under Computer Resources Support. Documentation of computer programs and related software is technical data. A Technical Data Analysis is conducted to identify what type, quantity, and on what media the technical data will be acquired, and where it will be stored (usually in a digital format on a computer system designed solely for storage of technical data). From this analysis a Technical Data Plan is developed. Acquisition logistics efforts should strive to optimize the versatility, flexibility, quality, accuracy, and ease of use of technical data. Technical data should be compatible with the planned support concept and represent the minimum essential to effectively support the fielded system. Government requirements for contractor-developed support data should be coordinated with the data requirements of other logistics elements to minimize data redundancies and inconsistencies. The project office should ensure compatibility with existing internal Coast Guard and government information processing systems.

b. Technical Drawings. An important note: there are three levels of Technical Drawings. Level 1 consists of simplified, basic drawings, while level 3 is the most technically complete to the point where they can be used for manufacturing. Level 2 drawings lie somewhere in the middle. If during the life of an item changes need to be made, level 3 drawings are usually required by the engineers. Level 3 drawings are usually less costly to buy during the initial acquisition rather than many years later during support.

6. Performance and Training Support. *(Responsible office CG-132).* Formally known as Training and Training Support, Performance and Training Support is interrelated with other logistics elements such as Manpower and Personnel, and Maintenance Philosophy. Performance and Training Support includes the processes, procedures, curricula, techniques, training devices, simulators, and other equipment and methods necessary to train civilian, active duty, and reserve personnel to operate, support, and maintain a system or equipment. This includes formal and on-the-job training, and non-training performance interventions (e.g., job aids, tech manuals), for both individuals and crews, during pre-delivery (deployment) training and follow-on training. It also includes an ongoing lifecycle evaluation of the effectiveness of new and existing training. The first step in Performance and Training Support is to conduct the appropriate analysis using Human Performance Technology (HPT) methodologies. An HPT analysis will identify new skill and knowledge requirements along with non-training performance interventions, including policy changes, assignment issues, equipment issues, and so on. There are various types of HPT analyses, including Performance Analysis, Front-End Analysis, Needs Assessment, etc. If an HPT analysis determines that training is required, further analysis will assist in specifying training options, such as e-learning, computer based training, resident, embedded, etc., how much training, on what equipment, and where the training will occur. In addition, analysis will help to determine who to train, who should be instructors, and other support and resources that are required. These results will feed into a Performance and Training Support Plan that addresses acquisition, installation, operation, and support of training equipment and devices, including simulators and software.

7. Facilities. *(Responsible office CG-43).* Facilities include the permanent, semi-permanent, or temporary real property assets (buildings, runways, swimming pools, towers, land, etc.) required to operate and support the system. A Facilities Analysis is conducted to define needed facilities or facility improvements and determine locations, space, utilities, environmental impact, real estate, and equipment needs. This analysis is then used to develop a Facilities Plan, which covers all facilities needed for the system. The facilities process has four steps:

   a. Planning. Define the system mission and identify the facilities required to support this mission (facilities analysis and plan).

   b. Programming. Acquire funding and people to implement the facilities plan.

   c. Budgeting. Present the approved construction project to Congress.

   d. Execution. Design, construct and activate facilities.

An important note: maximizing the use of existing facilities or their modification should always be considered first.

8. Packaging, Handling, Storage, and Transportation (PHS&T). *(Responsible Activities AR&SC/ELC).* PHS&T includes the resources, processes, procedures, design considerations, and methods to ensure that the system, equipment, and support items are packaged, preserved, handled, stored, and transported properly. A PHS&T Analysis is first conducted, and includes factors such as environmental considerations, preservation requirements for short and long term storage, transportability requirements, and other methods to ensure the elimination or minimization of damage to the system, its components, and its necessary support items. This analysis is used to develop a PHS&T Plan. Containers, forklift trucks, cargo aircraft, warehouses, commercial transport, security, packing materials, paperwork, transport schedules, preservation, cargo ships, dock workers, pipelines, and a host of similar factors characterize PHS&T. Key emphasis is on the avoidance of damage or deterioration in the safe and timely movement and storage of systems and spares. Reusable containers are considered for repairables, large items, ammunition, or those items requiring protection from humidity, temperature, sunlight, or altitude. All PHS&T of hazardous materials must be reviewed by a Hazardous Materials Specialist for compliance with Federal law.

9. Computer Resources Support. *(Responsible offices CG-6/CG-61/CG-62/CG-63/CG-64/CG-65).* Computer Resources Support is the facilities, hardware, software (system software and support software), software development and support tools, documentation, personnel, training or other resources necessary to operate and support embedded computer systems and software intensive systems. A Computer Resources Support Analysis is conducted to determine all factors necessary to support a system's computer hardware and software, including training, utilities, security, environment, and data storage. This analysis is used to develop a Computer Resources Support Plan. Projects that are purely computer/software in nature have special requirements and guidelines as information technology acquisitions stated in the Federal Acquisition Regulations (Part 39, Acquisition of Information Technology).

10. Design Interface. *(Responsible offices CG-6/CG-41/CG-45).* Design Interface is the process of designing "supportability" into a system. It should really be called "Influence on Design". Logisticians generally lack the technical knowledge to perform actual design work, whereas design engineers who do that type of work tend to focus on achieving system performance with little or no consideration for supportability. Supportability must be considered as part of the equipment design (including requirements generation and analytical activities), and continue through test and evaluation, production and fielding. An early focus on Design Interface should have the result of establishing support related design parameters. These parameters should be defined in both quantitative and qualitative terms, and relate specifically to readiness objectives and the support costs of the system. Design Interface consists of the following sub-elements:

a. Reliability, Maintainability, and Availability (RM&A). To design systems that will achieve certain defined levels of reliability, ease of maintenance, and how often they are available to perform their task. Availability is usually expressed as Operational Availability (A_o), which is most often described as a percentage of time. RM&A levels are usually expressed in a requirements document developed by the sponsor. The sponsor needs to identify operational requirements as early as possible, since they influence support design and potentially affect system selection. The logistician and engineer are responsible for placing RM&A requirements on contract as well as requiring the systems design support RM&A requirements. RM&A has a direct relationship with Design Interface.

b. Energy. To design systems for efficient use of energy. This goal affects both the types of energy sources and usage rates.

c. Survivability. To design the system to resist losses when operating in a defined, often man-made hostile environment.

d. Standardization and Interoperability. To design the system so that it interfaces well with systems used by other organizations, services, and countries.

e. Transportability. To design the system and/or its components for ease of movement and safety by conventional means of transportation, such as truck, ship, rail and air. Some items are unusually fragile or awkward in shape and size, so special equipment may be necessary (rent or design and build).

f. Human Factors Engineering. To design a system to make operation and maintenance by people physically accessible and easy.

g. Human Performance Technology. A systematic, analytical approach to solve performance problems (ex: an engine malfunctions and the maintenance team has difficulty accessing a database), and avoid performance problems (ex: analyzing a new engine to ensure proper support for operators and maintenance team). This systematic analysis of human performance is an opportunity that directly results in cost effective and efficient solutions, known as Human Performance Interventions. Examples of Human Performance Interventions include technical manuals, job aids, personnel changes, policy changes, process changes, training, and many others.

h. System Safety. To design the system so that it can be operated and maintained safely (within acceptable levels of physical risk by the user), for the systems' lifecycle until disposal.

i. Hazardous Materials. To design the system to minimize or eliminate the use of hazardous materials in its design and operation.

j. Corrosion Prevention. To design the system to resist corrosion damage to its component materials due to chemical, electrochemical, fungal, or bacterial attack

while exposed to natural or induced environments without requiring special protective measures.

k. Nondestructive Inspection (NDI). To design the mechanical and structural equipment of the system to facilitate ease of inspection using NDI equipment and techniques.

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CHAPTER 3. OTHER LOGISTICS CONSIDERATIONS

A. **Other Logistics Considerations**. Besides the ten logistics elements, there are other logistics or logistics related areas that are part of acquisition. These disciplines complement or tie together the ten elements of logistics. The disciplines are:

1. Supportability Analysis. Supportability Analysis, or the older process known as Logistics Support Analysis (LSA), is an analytical process that identifies system supportability requirements, the resources needed to effect sustained support, procedures for accomplishing system support tasks, and the appropriate level at which individual support tasks should be accomplished. This means that a system's designer must keep support of the future system in mind as the system is being designed. Some of the support questions that should be asked include: is this system repairable, are these parts obtainable, is this old technology or technology so unusual that support or maintenance is not cost effective? Supportability analyses are a wide range of related analyses that are conducted within the systems engineering process, and are explained in the System Integrated Logistics Support (SILS) Policy Manual, COMDTINST 4105.8. The goals of these supportability analyses are to ensure that supportability is included as a system performance requirement and to ensure that the system is concurrently developed or acquired with the optimal support system and infrastructure. These integrated analyses can include any number of tools, practices, or techniques to realize the overall support goals. For example, Level of Repair Analysis (LORA), Reliability Predictions, Reliability Centered Maintenance (RCM) analysis, Failure Modes, Effects and Criticality Analysis (FMECA), Life Cycle Cost Analysis, etc., can all be categorized as supportability analyses. The older process, LSA, mandated in MIL-STD-1388-1/2 series, is usually developed during the design phase of an acquisition. The result of these analyses are entered into a database called the Logistics Support Analysis Record (LSAR), which is used as an overall planning document.

2. Risk Management. Risk is inherent in any acquisition project and in virtually all areas, including the area of logistics. The project manager and other project personnel at all levels of responsibility, must address risk to ensure that the project is a success. Risk management is the act or practice of identifying and controlling known risks that can adversely affect a project. Analyses are conducted to ascertain where problems might occur in a project and then steps are taken to minimize each risk. This includes identifying, analyzing, and tracking risk drivers, assessing the possibility of their occurrence and their consequences, developing risk-handling plans, implementing these plans, and performing continuous assessments to determine how the risks change during the life of the project. The LEM must focus on risks affecting support, cost and schedule. Key support risks are those associated with achieving reliability, availability, and maintainability goals, achieving an effective logistics support structure; and successfully deploying/fielding the system. Cost and schedule risks are largely determined by the accuracy of earlier cost and schedule estimates and their supporting assumptions, as well as risks due to bottlenecking events or numerous risk situations occurring at the same time. Both tend to create multiple critical paths in the project time line. To effectively manage risks, the LEM must understand what adverse events might occur, the probability of each event occurring, and the severity of the cost, schedule, and

performance impacts of each event. By understanding the risks, the LEM works to make these risks either so small as to be negligible, deal with the cost, schedule, and performance effects of the risk in ways that minimize damage to the project, or just decide to accept the risk as reasonable given the cost, schedule, and performance advantages of the acquisition strategy and the project's requirements.

3. Life Cycle Costs (LCC). The Life Cycle Cost of a project is the total cost of acquiring, supporting, maintaining data/documents per prescribed dispositions, and disposing of a system. LCC is generally divided into two areas, cost estimating and cost management. Cost Estimates are developed as a comprehensive, accurate, and current estimate to support every management decision where cost is a significant factor. There are few decisions made during a project's life cycle that do not affect LCC. An LCC estimate should be accurate enough to permit a comparison of the costs of design and acquisition of several alternatives. Cost management is a process used to manage a product throughout its life cycle. This includes consideration of current and future costs and the effects of changes and modifications. LCC is a decision aid, and the LCC estimate should capture enough of the total ownership costs to help make well-informed decisions. The two main goals of LCC are to identify the total cost of various alternatives to attain a specific goal or performance specification while achieving production schedules, and estimate the overall cost impact of the various design and support options. The cost of operating and supporting a system over its useful life is generally greater than the initial acquisition price. Virtually everyone, from management to engineering, that influences the design of any part of a Coast Guard system or equipment, makes decisions affecting LCC. When developing a cost estimate, the LEM should define exactly what the estimate includes and excludes and what assumptions were made. Additionally, the LEM should ensure the estimate is complete and logical, and that all design and project changes are properly reflected. An LCC estimate should be developed two years prior to the need and formally entered into the Resource Proposal (RP) system. For acquisitions with multiple deliveries, the LCC should be refined with each subsequent RP submission. The following is a list of general elements used to develop LCC estimates:

   a. Mission Personnel. Operators and Maintainers.

   b. Unit-Level Consumption. Petroleum, Oil and Lubricants (POL), Energy Consumption, Consumable Material, Repair Parts, Depot Level Repairables, and Training Munitions/Expendables Stores.

   c. Intermediate Maintenance (External to Unit). Maintenance and Consumable Material/Repair Parts.

   d. Depot Maintenance. Overhaul/Rework.

   e. Contractor Support. Interim Contractor Support and Contractor Logistics Support

   f. Sustaining Support. Support Equipment Replacement, Modification Kit Procurement/Installation, Sustaining Engineering Support, Software Maintenance Support, Performance Support, and Simulator Operations.

   g. Indirect Support. Personnel Support and Installation Support.

4. Configuration Management(CM). Configuration Management is a defined process that applies sound business practices for managing the configuration of items, their defining technical data, and supporting data files. There are four distinct elements to CM. They are:

   a. Configuration Identification. Documents which describe the configuration baselines for the system and its lower-level items (including logistics support elements). When identified, an item is known as a Configuration Item.

   b. Configuration Control. The process that manages the current system configuration or baseline (what parts or items and their location in the equipment). Derived from the Configuration Identification process. The system or configuration baseline is modified by Engineering Change Proposals, which are documented requests to change the system design for a well-defined reason. These changes are approved by the Configuration Control Board, a chartered team of independent acquisition specialists who make sure all changes are affordable, supportable, and in the best interest of the system.

   c. Configuration Status Accounting. The process that tracks configuration changes (the insertion or substitution of parts/subassemblies that change the standard equipment/system configuration). It basically consists of a database fed by the transactions that take place during the CM process. It provides visibility into the current status of changes and other pertinent information concerning the system and its documentation.

   d. Configuration Verification and Audit. A planned review process used to verify that the system's performance requirements have been achieved by the product design, and the product design has been accurately documented in the configuration documentation. The process also includes verifying the incorporation of approved engineering changes. Configuration verification should be an imbedded function of the contractor's process for creating and modifying the product.

5. Diminishing Manufacturing Sources and Material Shortages (DMSMS). Also known as Obsolescence Management, DMSMS is a discipline unto itself. When the last known manufacturer of an item or raw material stops producing that item, it is considered obsolete. At the same time, that item may still be needed as a repair part on a Coast Guard system. DMSMS managers, who usually work with logisticians and project managers, use various computer tools and processes to track the obsolescence status of their equipment. They proactively work with industry to predict future obsolescence, and strive to mitigate obsolescence to such a degree that it has no negative impact. Obsolescence management is more than just a list of solutions. It is a management process that minimizes obsolescence problems throughout the life of a system, from the choice of parts in a new system that are not obsolete, to predicting when parts used in a current system will become obsolete. It is one key part of a system's lifetime support strategy. There are a number of solutions to an obsolete parts problem. They are:

   a. Reclamation. Removing a part from an existing system. Also known as cannibalization.

b. Substitute Part. A different part with the exact same form, fit and function.

c. Alternate Part. A similar part that does not have the exact same form, fit and function (may need to be modified).

d. Emulation. A manufacturing process that creates form, fit and function replacements for obsolete microelectronics in small or large quantities.

e. Redesign. When an existing circuit board or microelectronic item is redeveloped and remanufactured using new, non-obsolete components.

f. Life of Type Buy. Buying enough spare parts and then storing them to last for the expected life of the system.

g. Existing Source. Convince the existing manufacturer to keep producing that part.

h. New Source. A new manufacturer that is making the same part with the same form, fit, and function.

i. Redefine Mil-Spec. Change the Military Specification to better fit the actual requirements needed.

j. Replace System. If a system contains too many obsolete items, than it may be more cost effective to replace the system with a new one containing non-obsolete parts.

k. Contractor Inventory. Leftover items sitting in storage at a distributor's or prime contractor's facility.

l. Production Inventory. Leftover items from previous production sitting in storage at a manufacturer's facility.

m. Reverse Engineering. A process of developing an exact copy of an item through review of available technical data and physical disassembly and analysis of the original item and its components.

6. Commercial off-the-Shelf (COTS). Sometimes known as Commercial and Non-Developmental Items (CANDI), **c**ommercial items are those bought from a manufacturer or distributor, are designed for commercial, not government use, and are not significantly modified for government use. Non-developmental items are those that were previously developed and used exclusively by the Federal Government, a state or local government, or even a foreign government. Use of these existing, previously developed items, whether commercial or military, saves research and development costs, shortens fielding time, and reduces the risk associated with new development. Items developed primarily for non-Government sales may require performance trade-offs to meet Coast Guard needs, or it may be necessary to modify the item itself, which requires special management to handle the ramifications of the modifications.

7. Warranties. Administered by the contracting officer, the Federal Acquisition Regulations (FAR), section 2.101, defines a warranty as a promise or affirmation given by a contractor regarding the nature, usefulness, or condition of the end items or supplies, or the performance of services furnished under a contract. Warranty has two distinct meanings. It can be a specific remedy provision in a contract, or it can be more

broadly applied as a promise concerning quality. There are Express Warranties and there are Implied Warranties.

a. Express Warranties. A warranty that is "expressly" written into a contract, and fully describes all requirements of the warranty. As a general rule, once the Government accepts a product or service, that acceptance is conclusive unless there is fraud involved, a latent defect, or a mistake amounting to fraud. The Government has various clauses by which it acquires additional warranty remedies. Typically, a warranty is for a certain period of time, specific notice must be given, and certain actions, such as misuse, can void the warranty. These express warranties provide the Government with a level of insurance against inadequacies after system acceptance. The contractor bears the responsibility for the repair or replacement costs. Express Warranties can take many forms, the most common being:

   (1) Assurance Warranties. Guarantees or "assures" a specified level of performance, usually a minimum acceptable level spelled out in a specification. Basic assurance warranties may be appropriate in cases where the Coast Guard is interested in ensuring that minimum performance requirements are met, but higher risk projects can become more complex. An Essential Performance Requirement (EPR) warranty, a type of assurance warranty, specifies a level of performance that relates to a system, subsystem, or item specification requirement of the contract.

   (2) Incentive Warranties. While still requiring the assurance of meeting minimum acceptable requirements, Incentive Warranties provide motivation for the contractor to improve on the minimum acceptable performance requirements to reach a desired level of higher performance. The levels of performance that the contractor is "incentivized" or motivated to reach are normally stated as system goals (as well as in the incentive warranty itself). Incentive warranties may take on certain aspects of assurance warranties by requiring the contractor to guarantee certain minimum acceptable requirements while, at the same time, motivating the contractor to achieve the incentive goals. Incentive warranties are typically used when increased performance is desired.

   (3) Reliability Improvement Warranties. A type of incentive warranty. Over a fixed period of time, the contractor works to achieve reliability goals at specified intervals over the course of the warranty. Reliability measurements are taken at those intervals and, depending upon the contractor's success in reaching the stated goals, periodic incentive payments are made to the contractor.

   (4) Insurance Warranties. Protect the Government against substantial, possible losses due to high support costs or various types of inadequacies after system acceptance. The contractor bears the responsibilities for the repair or replacement costs.

b. Implied Warranties. Where a warranty is implied but not specifically written down. They are considered part of all contracts unless specifically disclaimed in writing.

These are duties and representations that exist even though they are not expressly written in the contract. Both parties give a warranty of cooperation. The Government gives a warranty as to the adequacy of its specifications, particularly when they are "design" specifications. There is also an implied duty of good faith and fair dealings. In a commercial contract, unless there is a disclaimer, the contractor gives a warranty of merchantability and "fitness for a particular purpose" to the buyer. When the Government buys a noncommercial item, the fitness and merchantability warranties do not apply. In a noncommercial contract, the Government is relying on its inspection rights and not on implied warranties.

c. Disclaimers. To avoid the responsibility of an implied warranty, contracts often contain disclaimers, which "disclaim" or deny responsibility for quality or performance beyond that designed into the part or system. A disclaimer may not be effective if it totally voids the purpose of the contract, so many disclaimers provide some very limited remedies. For example, many software items come with warranty terms that disclaim the warranties of merchantability and fitness, thereby limiting the purchaser's recourse after buying a bad product to returning the software and getting a refund. The Government itself cannot fully disclaim its own express or implied warranties regarding the adequacy of its specifications, but it can write limited, specific disclaimers, such as verification by site inspection. Draft disclaimers should be provided to G-LPL for legal review.

8. Metrics. Metrics are tools used by management to measure how effective something is. It is a measurement made over time, which communicates vital information about the quality of a process, activity, or resource. It is important to identify metrics during the design phase to help stay within cost, time and performance parameters.

a. Metrics Characteristics. The basic characteristics of a good metric are:

(1) It is meaningful in terms of customer requirements.

(2) It tells how well organizational goals and objectives are being met through processes and tasks.

(3) It is simple, understandable, logical and repeatable.

(4) It shows a trend, i.e., measures over time.

(5) It is unambiguously defined.

(6) The data is economical to collect.

(7) It is timely.

(8) It drives the "appropriate action."

b. Metrics Tools. There are a number of different Metrics tools that can be used. The most common are:

(1) Benchmarking. Benchmarking is a process to measure products, services, and practices against the toughest competitors or industry leaders, to discover relative strengths and weaknesses. It's designed to help recognize gaps between where an organization currently is and where it could be. It compares the current processes against those of other organizations to learn without reinventing existing processes. It gives an idea of where to focus improvement activities. To use this tool properly, all related processes must be known, strengths and weaknesses assessed, the processes to be benchmarked identified, other similar organizations studied including industry leaders or competitors, identify who does what best, incorporate the best practices into the project, understand why it is the best, tailor that practice to fit current needs, become the best, continue to compare and evaluate, and finally strive to become the benchmark for others.

(2) Charts. There are a number of charts used as Metrics tools. Generally, they are designed to analyze or breakdown a process into specific steps, measure a process, illustrate relationships or cause and effect, and display the relative importance of problems or conditions between variables. Charts help in understanding process interrelationships and are used to recognize areas needing measurement or improvement. Common chart types used are Flow Charts, Cause and Effect Diagrams, and Pareto Charts.

9. System Safety Planning. A safety plan for the end item designed to identify, evaluate, and eliminate safety hazards, or reduce the associated risks to an acceptable level, all the way through a system's life cycle. A System Safety Plan provides a basis of understanding between the contractor and the Project Office as to how the system safety project will be accomplished to meet the safety requirements of the contract. The plan is prepared so that it describes a system safety approach and involves system safety in all appropriate project activities. It also describes the contractor's approach in defining the critical tasks leading to system safety certification. The plan describes methods by which critical safety problems are brought to the attention of project management and for management approval of solutions of safety issues.

10. Environmental Considerations. The construction, operation, and disposal of a system can have a negative impact on the environment. An Environmental Impact Analysis is performed at the outset of an acquisition project to ensure that potential adverse effects on the human and global environment are accounted for and minimized during the evaluation and selection of a system.

11. Human Systems Integration. A discipline where accumulated knowledge is used to create compatibility between people, machines, and environments to ensure their effectiveness, safety, and optimal performance. The term covers all biomedical and psychosocial considerations. It includes, but is not limited to, principles and applications in the areas of human factors engineering, human performance technology, personnel selection, training and non-training interventions, life support, job performance aids, and human performance evaluation. The goal is to minimize or eliminate characteristics in a system's design that require extensive cognitive, physical,

or sensory skills, require excessive training or workload, or results in frequent or critical errors or safety/health hazards.

12. Cost Estimation. Cost Estimations are developed and used by management to help make informed business decisions, i.e., if we buy this system, how much will it cost to buy and support for twenty-five years? Cost Estimating methodologies help analysts create fairly accurate dollar costs for all sorts of acquisitions, such as buildings, boats, trucks, software, training, test equipment, etc., and all of its support. There are a number of different cost estimating methods, but the Coast Guard generally uses three. They are:

    a. Parametric. A summation of costs that are calculated based on the relationship of a particular variable and its cost. For example, the cost in dollars per square foot to construct a building, or dollars per cubic foot, or dollars for each pound of payload launched, or dollars per labor year spent writing software. The advantage is that it is faster to develop than most estimations and can be computerized. The disadvantage is that it cannot be used as a project management tool because only general cost factors are developed, not particular items and their costs.

    b. Analogy. A "big picture" approach where either total costs or costs of major project elements are compared to similar, past projects. The advantage to this method is that it is quick and gives good ballpark numbers. The disadvantage is that the projects being compared may be too dissimilar, and therefore give inaccurate results.

    c. Engineering or "Bottoms Up". Add up the costs for all the small tasks and purchases to get the total cost. The advantage is that it uses the expertise of the user and builds their commitment to the project. The disadvantage is that it's time consuming and it's easy to miss items.

13. Systems Engineering. An interdisciplinary process that evolves a customer's requirements into an integrated and life-cycle balanced set of product and process solutions. This structured, process approach integrates the three interrelated design efforts of hardware, software, and planned logistics. The systems engineering process follows a top-down, logical progression of design refinement. Operational requirements are translated into performance requirements for each functional element of the system. Then different design alternatives for each functional element are developed and analyzed, and the best combination is selected to achieve the system's objective. Performance requirements are further refined, and then this process starts again on the next lowest level of performance function. This "decomposition" of functions and performance refinement continues down to the lowest level of function that can be given a performance requirement. Once this is achieved, hardware items can be selected and arranged in relation to one another. Analyses are conducted to verify each successively higher level of requirements. Estimates and projections are refined and verified using demonstrations and tests. Logistics plays a key part as well by determining the best set of logistics resources to support a system. Other disciplines that play an important part include Trade-off Studies to find optimal solutions, Risk Management to identify and evaluate potential risks, Configuration Management to

control the characteristics and documentation of the item, Diminishing Manufacturing Sources and Material Shortages to control obsolescence, Data Management to capture and control the technical baseline and provide a ready reference for the engineers, Performance Metrics to measure how well the technical development and design are evolving, Interface Controls to ensure all internal and external interface changes are recorded and communicated to affected items, and Structured Project Reviews to demonstrate and confirm completion of required tasks and objectives. Engineering and Supportability problems first manifest themselves as supply problems. These supply problems usually require an engineering solution.

14. Supportability. The degree to which the characteristics of a systems design plus its planned logistics resources meet the system's requirements. It is a means of judging whether a logistics strategy will meet the support needs of the equipment. Like Reliability and Maintainability, it also has a direct relationship with Design Interface. Support requirements are not stated as logistics elements, but as performance requirements that relate directly to operational effectiveness. Examples of support requirements are Repair Cycle Time, Mean Time to Repair, and Mean Time Between Failure. Two measures of Supportability are Operational Availability (Ao) and Life Cycle Cost. Supportability Analyses are a wide range of related analyses that are conducted during the Systems Engineering process. The goals of these analyses are to ensure that supportability is included as one of the system performance requirements, so that as the system is developed or acquired, the optimal support system is developed too. Types of Supportability Analyses include Repair Level Analysis, Reliability Predictions, Reliability Centered Maintenance Analysis, Failure Modes, Effects and Criticality Analysis, Life Cycle Cost Analysis, etc.

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CHAPTER 4. THE ACQUISITION PROCESS

A. **Purpose of Acquisition**. The fundamental purpose of the acquisition process is to buy things, and that's basically what the Coast Guard acquisition workforce does. It buys goods and services for our customers, the men and women of the Coast Guard, who perform our many and varied missions, and ultimately serve the American public. Examples of acquisition purchases include cutters, aircraft, aircraft hangars, motor lifeboats, training classrooms, rigid inflatable boats, night vision goggles, flight suits, cold weather clothing, global positioning systems, hand-held radios, computer software programming, maintenance tools and test equipment, specialized shipping containers, etc. These acquisitions tend to be for special, complex, or costly items, and not for common purchases such as brooms, mops, office equipment, pick-up trucks, medical equipment, etc. Although most Coast Guard acquisitions are not major acquisitions or multi-million dollar projects, but mid-sized purchases, the elements of Integrated Logistics Support still need to be considered for all acquisitions. While a LEM will be formally included in planning for major acquisitions, LEMs will have to be more proactive in midsized and small acquisitions to make sure logistics concerns are thoroughly addressed. It is easy to forget logistics when buying small quantities of low dollar value items.

B. **Acquisition Process**. For the Coast Guard, the acquisition process (similar to that of the Department of Defense) starts with a specific "need", a requirement to replace a current item or acquire a completely new item for an existing or new mission. Requirements are generated to produce information for high level decision-makers on the projected mission needs of the user, and are developed into a Mission Needs Statement**.**

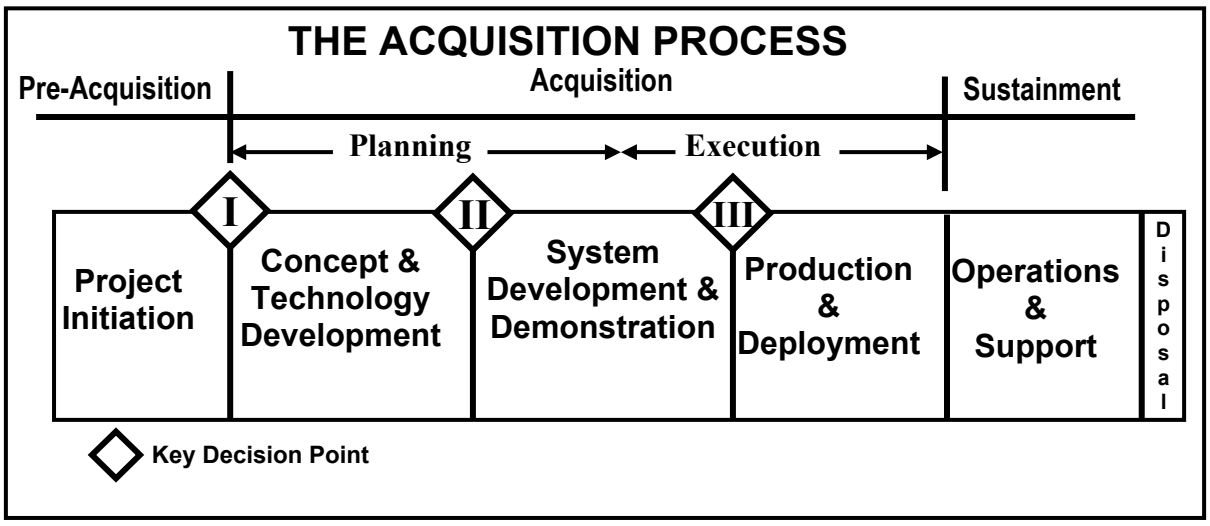

Table 4.1 The Acquisition Process (Source: Major Systems Acquisition Manual, COMDTINST M4150.2 (series)

1. Mission Needs Statement (MNS). Mission needs are defined in broad operational terms (drug interdiction) which then evolve into specific operational requirements (reduce drug flow entering Florida). The Acquisition Executive of the Department of Homeland Security validates and approves the mission need, confirms the fact that a simple

purchase alone cannot satisfy the situation, and identifies that a potential new concept or system solution should be considered. In summary, all acquisition projects are based on identified, documented, and validated mission needs. Mission needs, which result from ongoing assessments of current and projected capability, are designed to establish a new operational capability, improve an existing capability, or exploit an opportunity to reduce costs or enhance performance.

2. Cost Objectives. Upon approval of the MNS, Cost Objectives are formulated and refined. Project managers establish life-cycle cost objectives for the acquisition and support of the project by considering projected future resources (dollars and people), recent costs, parametric estimates, mission effectiveness analyses, and technology trends.

3. Operational Requirements Document (ORD). Next, the operational requirements, a description of the general functions the item needs to perform, are developed and recorded in an ORD. It documents thresholds, objectives, and minimum acceptable requirements for the proposed concept or system. Thresholds and objectives are derived from an analysis of alternatives and the amount of funding allocated to the project. Capabilities or characteristics, known as thresholds, that are so significant that failure to meet them can be cause for the concept or project to be reevaluated, reassessed or terminated, are called Key Performance Parameters (KPPs). KPPs are included in the ORD and can stop a project if they cannot be met.

C. **Acquisition Phases**. The acquisition process is divided into three phases, each one beginning with a Key Decision Point (KDP), a defined critical point in the process where high level management approval is required to start the next phase of the process. KDPs are numbered I, II, and III (Table 4.1).

1. Key Decision Point I. The beginning of the Concept and Technology Development phase, where concepts and ideas for systems are analyzed. This phase typically consists of several competitive, parallel, short-term studies designed to define and evaluate various concepts, as well as provide a basis for analyzing each concept's advantages, disadvantages, and amount of risk. The most promising are defined in terms of broad objectives for cost, schedule, performance, software requirements, opportunities for tradeoffs and risks, overall acquisition strategy, and test and evaluation strategy.

2. Key Decision Point II. The beginning of the System Development and Demonstration phase. At this time, the most promising concept/design approach is chosen and developed into an end product (hardware and/or software) that can be tested, and later, mass produced. Factors that should be taken into account during this phase are stability of design, interoperability, ease of manufacture, difficulty of support, and overall cost-effectiveness. The new end item is laboratory tested (Developmental Test & Evaluation) and field tested **(**Operational Test & Evaluation), to see if it meets project objectives. Manufacturing processes are examined and validated for efficiency and cost effectiveness. Design fixes or upgrades are incorporated as needed. In some projects, Low Rate Initial Production (the production of small quantities of the item) starts now in order to push the new item into the field faster, produce production models for field

testing, and create an orderly increase in production leading to full-rate production. Serious logistics planning begins during this phase.

3. Key Decision Point III. The beginning of the Production and Deployment phase. This is when actual mass production of the finished item occurs. The necessary logistics systems are in place and running to support the new items. Production often continues for many years based on the size and complexity of the item, the quantities needed, and the amount of funding available. Deficiencies discovered during testing/use are resolved and changes incorporated into the production line.

4. Transition to Sustainment. A very important and often ignored "in-between" step between KDP III and Operational Support phases, it is the process where the acquisition team transfers to the operational sustainment support team all project management responsibilities, on-going tasks, and processes. It is a planned, orderly process, transparent to the customer and easily managed and accepted by the support community, that begins one to two years before the Operational Support phase begins, and is described in a Transition Plan. It is planned and managed by a Transition Team made up of members of the acquisition team, operational support team, various headquarters' offices, and field activities that will have support responsibilities. See the System Integrated Logistics Support (SILS) Policy Manual, COMDTINST M4105.8 (series).

5. Operational Support. After Production and Deployment, after the last item is produced, and throughout the lifetime of the item, there is a final phase in the life of a system, called Operational Support (no KDP)**.** During this time, the item will probably be modified and upgraded to improve its performance and meet changing requirements. It may also be placed in storage after several years of use or even when brand new, with an eye toward possible future need during an emergency or to fill a new requirement (i.e., replacement aircraft for those destroyed in combat or in accidents). It could also be sold to a foreign government, a program called Foreign Military Sales (FMS).

6. Demilitarization and Disposal. The final step in an item's lifecycle. All military functionality is removed as well as precious metals and any obsolete parts needed for other equipment. The item is then sold or destroyed. All system technical data and plans are also disposed of, except for one copy of selected material of historic significance which is sent to the Coast Guard Historian.

7. Summary. The product of the systems acquisition process is a system or end item that represents a judicious balance of cost, schedule, and performance in response to the user's needs. It is interoperable with other systems (DoD, Coalition, and Allied systems), uses proven technology, open systems design, available manufacturing capabilities or services, smart competition, and is affordable and supportable. Once deployed, the system is supported throughout its operational life and eventual disposal using prudent combinations of organic and contractor service providers, in accordance with Congressional statutes (see reference (b) for more detailed information).

D. **Specification Based Versus Performance Based Acquisition**. Primarily since WWII, the Coast Guard has procured the vast majority of its material using a specification based acquisition system, where Technical Data Packages (TDPs) were developed by the Government containing Detailed Design Data (DDD). This data included detailed military specifications and standards, manufacturing drawings, manufacturing processes, inspection procedures, test equipment and gauge designs. Basically, the Government told the manufacturer what to produce and how to produce it. Justification for using a specification based acquisition strategy was the need for strict product quality control (rugged and reliable), configuration control and part standardization for supportability, and to simplify competitive reprocurement. This method gave priority to the detailed design of the item and its associated data over all other contractual documentation. It imposed a large amount of technical and contract administrative work on both the contractor and the Government. Because it defined "requirements" in the absolute and rigid terms of the TDPs and DDDs, it limited product improvement and cost reduction opportunities by offering little opportunity or incentive for the contractor to improve either the product or manufacturing processes. Performance Based Acquisition involves acquisition strategies and processes that describe and communicate measurable outcomes or performance parameters, rather than specific processes to achieve a desired performance, i.e., build an aircraft that will fly at this altitude, for this length of time, and at this speed. It is structured around defining a requirement in terms of specific performance objectives and providing contractors the latitude to determine how to meet those objectives (see FAR Part 11 – Describing Agency Needs). Simply put, it is a method for acquiring *what is required* and placing the responsibility for *how it is accomplished* on the contractor. To be considered performance-based, an acquisition should contain, at a minimum, the following elements:

1. Performance Work Statement. Describes the requirement in terms of measurable outcomes or performances.

2. Measurable Performance Standards. Determines whether performance outcomes have been met, and defines what is considered acceptable performance.

3. Remedies. Procedures that address how to fix actual performance that does not meet performance standards. While not mandatory, incentives should be used to encourage performance that will exceed performance standards. Remedies and incentives should complement each other.

4. Performance Assessment Plan. Describes how contractor performance will be measured and assessed against performance standards.

5. Working Relationships. A close working relationship between the government and the contractor is essential in performance based acquisition. The Coast Guard's relationship with contractors should promote a strong and positive business alliance to achieve mutually beneficial goals, such as timely delivery and acceptance of high quality goods and services. This is important for meeting mission objectives and resolving problems. Both parties should clearly understand the goals, objectives, and needs of the other. It is essential that government and industry work together as a team to communicate expectations, agree on common goals, and identify and address problems early on and

all throughout the acquisition, to achieve an outstanding product. At the same time, it must be remembered that the contractor is not the Government and discussion must be at arms length. Any discussions that change the rights or duties of the parties (i.e., contractor or Government) must be done in conjunction with the contracting officer.

E. **Coast Guard Organizations Involved in Acquisition**. The following headquarters' offices play a part in the acquisition process:

1. Acquisition Directorate (G-A). All codes manage acquisition projects, usually major projects.

2. Engineering and Logistics (CG-4). Supports acquisition projects in Commandant (G-A) and performs smaller acquisitions. Offices involved in acquisition and support are:

   a. Computer Systems (CG-63)
   b. Electronic Systems (CG-64)
   c. Communications Systems (CG-62)
   d. Aeronautical Engineering (CG-41)
   e. Civil Engineering (CG-43)
   f. Naval Engineering (CG-45)
   g. Logistics Policy (CG-44)
   h. Logistics Information (CG-44)
   i. Force Management (CG-48)
   j. Resource Management (CG-48)
   k. Systems Planning (CG-48)
   l. Deepwater (G-SDW)

3. Deepwater Project (G-D). All codes are dedicated to managing the Deepwater acquisition project.

4. Operations Directorate (G-O). The following codes support G-A projects or conduct small item acquisitions:

   a. Aviation Forces (G-OCA)
   b. Command and Control Architecture (G-OCC)
   c. Deepwater Sponsors Representative (G-OCD)
   d. Boat Forces (G-OCS)
   e. Cutter Forces (G-OCU)
   f. Law Enforcement (G-OPL)
   g. Aids to Navigation (G-OPN)
   h. Search and Rescue (G-OPR)

5. Human Resources (CG-1). The following codes support G-A projects:

   a. Civilian Personnel
   b. Military Personnel
   c. Manpower
   d. Training and Performance
   e. Safety and Environmental Health

6. Marine Safety and Environmental Protection.

7. The Judge Advocate General Office of Procurement Law (G-LPL). Reviews contracts and policy documents to make sure they are within the letter and spirit of the law, and any matter may be referred to G-LPL for acquisition law related consultation for review of contract documents and actions.

8. Planning, Resources and Procurement Directorate (CG-8). CG-8d is the Coast Guard's Head of the Contracting Activity (HCA), and is the Source Selection Officer (SSO) for all Coast Guard acquisitions over $50 million. Offices involved in acquisition and support the HCA are:

   a. Office of Procurement Management (CG-85). CG-85 serves as a Coast Guard wide advisor regarding compliance with the Competition in Contracting Act (FAR Part 6), Coast Guard Standardization Program, COMDTINST 4200.38 (series), and setting Coast Guard acquisition policy via Coast Guard Acquisition Procedures, COMDTINST M4200.19 (series). The office also arbitrates industry complaints regarding the Coast Guard's acquisition process in accordance with Coast Guard Ombudsman Program for Agency Protests, COMDTINST 4200.14 (series).

   b. Chief of the Contracting Office (COCO). All Coast Guard units have a COCO office assigned to them. The COCOs manage the Contracting Officers and other contracting personnel that will do the actual buying (contracts) for the LEMs and any other requirements personnel.

9. Other organizations that have a role because of their specialized knowledge include:

   a. Engineering Logistics Center (ELC). Fleet maintenance management and logistics sustainment.
   b. Coast Guard Yard. Ship and boat construction and repair.
   c. Aircraft Repair and Supply Center (AR&SC). Aircraft repair, upgrade, and support.
   d. Command and Control Engineering Center (C2CEN). Develops, builds, and fields advanced electronic command, control and navigation systems.
   e. Telecommunication and Information Systems Command (TISCOM). Develops, builds, fields, and manages telecommunications and computer systems.

f. Maintenance and Logistics Command Pacific (MLCPAC). Provides maintenance and supply support to the surface fleet, Pacific region.

g. Maintenance and Logistics Command Atlantic (MLCLANT). Provides maintenance and supply support to the surface fleet, Atlantic region.

h. Coast Guard Research and Development Center (R&DCEN). Conducts research projects for acquisition projects, as well as Independent Operational Assessments or Independent Operational Test and Evaluation Assessments.

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CHAPTER 5. THE PROJECT OFFICE

A. **The project office is the working level organization under the Acquisition Directorate (G-A) that is chartered to acquire major or medium-sized equipment or software, i.e., aircraft, radar, facilities, boats, etc**. A project office exists only for the duration of the acquisition, for the three phases of acquisition. After the last item is purchased, the project office is disbanded and its staff moves on to other projects. Responsibility for supporting the new equipment is passed to the Engineering and Logistics Directorate (CG-4). Depending on the size and complexity of the project, the project office can consist of many specialists, including contract specialists, various types of engineers, logisticians, financial analysts, administrative specialists, business managers and support contractors. The LEM is one of the logistics specialists. If particular technical knowledge is required, the project manager can obtain help from other Coast Guard offices, field activities, or support contractors.

B. **Basically, the project office is focused on planning and coordinating the acquisition effort, while overseeing the efforts of the prime contractor**. Their responsibilities are:

1. Meet performance, schedule, and cost objectives.
2. Develop, maintain, and comply with all project related plans.
3. Schedule project activities and monitor progress.
4. Meet all requirements of applicable directives and regulations in a timely manner.
5. Provide weekly progress reports to the Assistant Commandant for Acquisition.
6. Maintain the project financial plan and ensure a complete audit trail of project funds.
7. Submit or ensure submission of appropriate requests for resources (funds and personnel) needed to develop, acquire, and initially support the acquisition.
8. Maintain complete, up-to-date documentation of all actions and decisions.
9. Act as the principal source of information for internal and external inquiries and briefings on the project.
10. Ensure that the interests and requirements of all operating and support project managers are integrated into the project.
11. Maintain a Lessons Learned file.

C. **Some project offices are "joint" organizations, containing people from other military services or Government agencies, from the prime contractor, or both**. For information that is more detailed see reference (b).

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CHAPTER 6. THE LEM'S ROLES AND RESPONSIBILITIES

A. **Acquisition is a team enterprise**. Every acquisition project has at least one management team performing all of the tasks necessary to start and manage a project. Large projects have dozens of teams, each concerned with a different aspect of the acquisition, including logistics. The primary team that the LEM belongs to is the ILS Management Team (ILSMT), which is responsible for managing all logistics aspects of a project. Team members will include the ILS Manager, other LEMs, prime contractor personnel, and other specialists as needed (contract specialists, configuration management specialists, user representatives, etc.).

B. **The LEM's role as a team member is to make certain that their cognizant logistics' element(s) is fully covered and funded, and that tasks pertaining to cognizant elements are being accomplished in a complete and timely manner with an eye toward transitioning into regular operations and support**. The LEM also participates as a subject matter expert for the element, and may be tasked by the team to do special studies or projects. Often, the LEM will have access to Coast Guard specialists who can be called in to give advice or perform technical studies. The Contracting Officer is a key acquisition team member who should be contacted right after project requirements are identified to assist in developing an acquisition and sustainment strategy.

C. **The LEM should be a well trained and experienced specialist with professional certification**. A LEM usually works for the project Integrated Logistics Support Manager. The LEM's primary responsibility is to manage one or more of the ten logistics elements plus other key elements in an acquisition project. "Managing" generally means overseeing the efforts of Coast Guard personnel or a prime contractor or manufacturer. A prime contractor will build items for the Coast Guard, and include in the effort the planning and establishment of logistics support for the item when it is fielded. The LEM oversees this effort to make sure it is done well and completely. The LEM, Coast Guard personnel, and the prime contractor work together via Integrated Process Teams to establish the logistics needs of the project, document them in the form of "plans" for each element, and develop an Integrated Logistics Support Plan (ILSP). Then the prime contractor executes the plan with the help of the LEM. For small acquisition projects, the LEM may be the only logistician on the project, and might have to develop and write the ILSP and plans himself. The LEM is also part of the sustainment phase of the projects lifecycle, and is therefore a part of the sustainment office.

D. **The duties of a LEM are**:

1. Ensure all cognizant logistics tasks (elements) are thoroughly defined, well managed, and timely executed. These tasks include Configuration Management and Diminishing Manufacturing Sources and Material Shortages.

2. Provides advice and recommendations to the PM concerning logistics, including requirements during the initial stages of project development.

3. Chairs Integrated Process Team for assigned element(s). Responsible for the successful completion of all actions issued by the IPT.

4. Maintain a good working relationship with the prime contractor's logistics staff and the acquisition project staff, and tracks the progress of the contractor.

5. Identify logistics requirements and constraints at the beginning of a project to help develop the RP and the final contract.

6. Identify requirements and plan for and acquire material, facilities, personnel, and services for assigned logistics support elements.

7. Develop or assist in developing ILSPs.

8. Prepare required documentation for assigned logistics support elements in support of the ILSP development efforts and the acquisition project.

9. Serve as a member of the project's ILS Management Team.

10. Update and adjust as necessary project documentation and the adequacy of logistics support.

11. Review ILS contract deliverables as necessary, or oversee the review by support contractor personnel.

E. **Matrix Relationships**. The LEM works with many specialists, usually as part of a matrix organization. They include engineers, contract specialists, financial planners, legal counsel, support contractors, scientists, manufacturer's representatives and their sub-contractors, and many other specialists. These individuals have the technical expertise the LEM will need to work issues, answer questions, or gather data. Developing a network of relationships with these experts is key to a LEMs success.

CHAPTER 7. FUNDING

A. **Funding**. Funding, or Appropriations, are voted every year by Congress for the use of the Coast Guard. Funding drives the acquisition process. It sets an acquisition project's overall limits, i.e., capability, size, quantity purchased, etc. The Office of Budget and Programs (CG-82) is the office that handles the Coast Guard's money. Funding is divided into a number of different categories or "colors", which are:

1. Operating Expenses (OE). Provides for the operation and maintenance of all authorized Coast Guard projects and facilities not otherwise specifically provided for in other appropriations or funds. Includes most military and civilian pay (some funded under AC&I).

2. Acquisition, Construction and Improvements (AC&I). Provides for the acquisition, construction, rebuilding, and improvement of vessels, aircraft, shore facilities, aids to navigation systems and facilities, and Command, Control, and Communication (C^3) systems and related equipment.

3. Research, Development, Test and Evaluation (RDT&E). Provides for all necessary expenses for applied scientific research, development, testing, and evaluation, including the maintenance, rehabilitation, lease and operation of related facilities and equipment.

4. Reserve Training (RT). Provides for all necessary expenses for the operation and administration of the Coast Guard Reserve program. It includes the costs of the Annual Training and the Special Active Duty Training programs, and the costs of the Inactive Duty Training program.

5. Environmental Compliance and Restoration (EC&R). Provides for environmental compliance and restoration of contamination from hazardous substances and pollutants at all current and former Coast Guard facilities. It provides for identification, investigation, and cleanup. Also funded are activities to ensure that all shore facilities and vessels comply with applicable federal, state, and local government environmental laws and regulations.

6. Oil Spill Liability Trust Fund (OSLTF). Used to finance oil pollution prevention and cleanup responsibilities, as well as financing annually up to $50 million of emergency resources and all valid claims from injured parties resulting from oil spills.

7. Alteration of Bridges (AB). Provides for the government's share of altering or removing railroad and publicly owned bridges that obstructs the navigable waterways of the United States.

8. Retired Pay (RP). Provides for the retired pay of former military members of the Coast Guard, the Coast Guard Reserve, and members of the former Lighthouse Service. It also funds survivor annuity payments under the Retired Serviceman's Family Protection

Plan and the Survivor Benefit Plan, and medical benefits for retirees and their dependents.

9. Industrial Base (IB). Funds the industrial facilities at the Maintenance and Logistics Commands (MLCs).

10. Boat Safety Account (BS). Provides funding for the development and implementation of a coordinated national recreational boating safety program.

B. **Revolving Fund**. A special type of "self-financing" fund, where "customers" (CG activities, cutters, etc.) are charged for the services or materials furnished. This income is in turn used to buy replacement services and materials which are then in turn bought by customers, and so on. Therefore, funding does not come directly from an appropriation, but indirectly through the customer. There are two types of revolving funds:

1. Supply Fund (SF). Provides financing for a continuous cycle of sales and purchases involving clothing, food, and general stores items. Generally, the SF inventory includes low cost, high turnover consumable items and repetitive use items.

2. Yard Fund (YF). Finances the industrial operations of the Coast Guard Yard. The Yard provides services such as construction, repairs, alteration of vessels and small boats, and fabrication of buoys and other special items for the Coast Guard and other government agencies. These customers pay the Yard for these services from their respective appropriations. The charges to the customer by the Yard are based upon recovery of its total industrial cost of doing the work.

C. **Allotment Fund Control Code (AFC)**. A method of breaking down the OE and RT categories of money into smaller accounts and functional categories to designate responsibility for funds management. The various codes are:

1. AFC-01 - Military Pay
2. AFC-08 - Civilian Pay
3. AFC-20 - Permanent Change of Station (PCS)
4. AFC-30 - Operating and Maintenance
5. AFC-38 - Industrial Support Activity Revolving Fund
6. AFC-40 - Chief of Staff Administrative
7. AFC-41 - Aeronautical Engineering
8. AFC-42 - Telecommunications
9. AFC-43 - Civil Engineering
10. AFC-45 - Naval Engineering
11. AFC-54 - Ordnance
12. AFC-56 - Training
13. AFC-57 - Medical

14. AFC-75 - Reimbursable/Refund Program
15. AFC-77 - Reimburasble Execution Accounts
16. AFC-80 - Reimbursables
17. AFC-88 - Reimbursables Special Purpose Account
18. AFC-90 - Reserve Training Program Expense
19. AFC-94 - Reserve Training Reimbursable Program
20. AFC-97 - Reserve Training Refund Program
21. AFC-98 - Reserve Training Civilian Pay

D. **Funding Process.** Basically, funding, called an Apportionment, comes from the Office of Management and Budget (OMB). It is subdivided into smaller amounts, called Allotments, by the Chief of Staff's office, who distributes it to Allotment Fund Code (AFC) managers, who in turn distribute it to the next level, called Administrative Target Units (ATU), which is at the level of a District, Maintenance and Logistics Command (MLC), Headquarters, etc. These Targets are further broken down into Project Targets (AFC accounts), and these are subdivided into Program Elements which are the working level blocks of funding and are tracked by a Project Number. Funding is divided up by committees or boards, usually consisting of senior captains, admirals, or civil servants. Unless otherwise stated in the law, funds must be used only for those purposes authorized in the law, and for only the period of time authorized (time limit). Funds can be Annual, lasting one year, or Multiple Year, which means they are good for a specified number of years. Once the time limit is past, any unspent money is considered "expired" and cannot be spent on new obligations. There are also "No Year" funds where no time limit is assigned. Supplemental Funds are legislatively funded adjustments to the Coast Guard budget authority provided outside the normal annual budgeting process to address unplanned for funding. For more detailed information on funding, see the Financial Resource Management Manual (FRMM), COMDTINST M7100.3 (series).

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CHAPTER 8. CONTRACTING

A. **Definition of a Contract**. A Contract is a mutually binding legal relationship obligating the seller to furnish acceptable supplies or services, and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds, and that, unless otherwise authorized, are in writing. The goal of any contract is to provide the means for a successful procurement. A procurement is successful when a contractor profits from the timely delivery of quality products which meet the needs of the Coast Guard. Contracts are developed and administered by Contracting Officers who are certified specialists trained in all aspects of contracting. The entire contracting effort is defined by the Federal Acquisition Regulations (FAR), which covers all aspects of Government contracting.

B. **Consideration**. An important term to understand, consideration means something of value given in return for performance (a task accomplished) or a promise of performance by another. In a Government contract, consideration usually means the contractor's promise of performance and the Government's promise of payment.

C. **Types of Contracts**. The following are the basic types of contracts used by the Government:

1. Fixed Price. The price is decided or "fixed" at the contract start. This type of contract is not subject to adjustment on the basis of the contractor's cost experience. There are several versions of fixed price contracts, including Fixed Price with Economic Price Adjustments, or Fixed Price with Incentive. They provide more flexibility to the basic contract form.
2. Cost Reimbursement. The Government pays the reasonable, allowable, and allocable costs, plus applicable fees, up to a predetermined ceiling price. The contractor notifies the Government when its costs are approaching the ceiling price, and bears the risk of not being paid if costs exceed the ceiling. It establishes up front an estimate of total cost to help obligate funds with a ceiling that the contractor may not exceed without approval.
3. Time and Materials or Labor Hours. For acquiring supplies or services based on labor hours spent at fixed rates and material costs, and include overhead, profit, and material handling fees. Sometimes the materials are contractor furnished, other times they are Government furnished. This is the least preferred contract type because the contractor's profit increases the longer it takes him to produce the item, which is not an incentive for speed or economy of production. A Labor Hours contract is a variation where only labor is acquired. A good example are support contractors hired to assist project managers with their workload, i.e., write ILSPs, training plans, plan and run ILSMTs, etc.
4. Performance-Based Contracting (PBC). A concept where the acquisition itself, including the contract, is structured to define the purpose of the items or work to be purchased, rather than how the work is to be done. The desired performance is first clearly and carefully defined, from which the contractor develops a solution using a

strategy of the contractor's choosing. Critical elements of effective PBC are a well defined and clearly written statement of work with achievable performance standards, a performance requirements summary which sets the performance standard for each deliverable of the contract, defines where possible, acceptable quality levels, methods of surveillance and percentage of the contract price each deliverable represents, to establish the basis of payment for acceptable and non-acceptable performance, and a quality assurance surveillance plan. There are certain key characteristics that make performance-based contracts different from other contract forms. The concept of performance-based contracting is centered on a contract instrument that defines performance expectations in terms of outcomes or results as opposed to methods, processes, systems or broad categories of work activity. To the maximum extent possible, it describes the work in terms of what is to be the required output rather than how the work is to be accomplished. The second component of PBC is that responsibility is placed on the contractor for assuring quality performance. The contractor's compensation is tied to the achievement of the defined outcomes or results. This requires that formal and measurable performance standards, including surveillance plans, be developed to facilitate the assessment of contractor performance. In some cases, the ultimate performance requirements (e.g., Availability) may be deleted as a contract metric because the contractor may not have full control or authority over all of the support functions that produce system availability – some support functions may continue to be performed by organic organizations or other support providers. Accordingly, the contract metrics should reflect the highest level of metric(s) that are the most critical in producing the desired performance outcome(s). When a range of performance is desired, the acceptable range must be defined. Appropriate incentives are created to motivate contractors to meet and exceed higher levels of performance than have been expected in the past. Criteria are included to require or incentivize contractors to pursue opportunities to subcontract for tasks that other entities may better perform at less expense than the management contractor. In addition, provisions may be included that create specific incentives for cost savings and improved financial accountability.

D. **Contract Features**. Contracts often have special features which determine how the contractor is paid or how the item produced is delivered. Some of these features are:

1. Incentive. Where the amount of profit or fee made by the contractor is based upon his performance. The contract is written so that the contractor will be given more money or bonuses for meeting or exceeding the agreed upon level of performance. Otherwise, he receives a basic fee.
2. Adjustments. Contracts, especially fixed price contracts, can have economic adjustment provisions. This is a way for the contractor to raise the fixed price of an item because of an increase in costs, for example in raw materials, that are not under his control. It allows the contractor to maintain a reasonable profit margin.
3. Indefinite Delivery. When a specific delivery date is not required and where the item price is fixed. There are two types of Indefinite Delivery contracts. The first is Definite Quantity, where a specific quantity is delivered at any time over a defined period. The second is Indefinite Quantity or Requirements, where specified items are purchased via

the contract in any amount, over a defined period, though there is usually a minimum number of items that must be purchased. A Requirements feature does not specify a minimum quantity order, but promises that all orders for that item will be from that contractor.

4. Letter. A preliminary agreement before a contract is issued that allows for the immediate start of item manufacturing or the performance of services. Used when something needs to be started right away.

5. Award-Term Contract. Award-term arrangements are very similar to award-fee contracts, however, instead of money as compensation for quality performance, the contractor is awarded additional periods of performance. Or, if performance is habitually below standard, the period of performance can be shortened. Award-term arrangements are most suitable when establishing of a long-term relationship is valuable both to the government and to the potential contractor. They differ from options in that award terms are based on a formal evaluation process and do not entail the regulatory procedures associated with priced options. Award-term arrangements are relatively new.

E. **Other Instruments**. Besides formal contracts, there are other contractually related instruments. A Letter Contract is a written preliminary contractual instrument designed to get work started right away while the contract is being developed. A Basic Ordering Agreement (BOA) is not a contract but a framework for orders, and each order under a BOA is a separate contract. A Military Interdepartmental Purchase Request (MIPR) is a request for work, supplies or services from DoD activities, and has its own process and series of forms. Grants and Cooperative Agreements can expend funds and further the Coast Guards purposes, but are not contracts. Other Transaction Authority (OTA) exists in some instances for what amounts to contracts outside the scope of the Federal Acquisition Regulations. Memorandum of Agreements and Memorandum of Understandings are not contracts and should not obligate funding. Caution has to be exercised that these do not amount to contracts in disguise.

F. **Parts of a Contract**. In the standard contract format, each section deals with a different aspect of the agreement. To the maximum extent possible, repetition should be avoided and cross-references used to minimize the possibility of conflicting information. A contract will have an "Order of Precedence" clause, which deals with the order between specifications, clauses, attachments, and drawings. This is a "last resort" clause and effort should be made to read the contract as a whole to try and give meaning to all parts. A contract usually consist of the following sections:

1. Section A. The general award information; a coversheet that lists the name of the contractor and his address, the contract number, the dollar amount of the contract, the name of the contracting officer, and other basic data.

2. Section B. A description of supplies and services to be provided by the contractor, each with a Contract Line Item Number (CLIN), quantity ordered, unit price and total amount for the effort, as well as information such as inspection and acceptance, quality, delivery, and short form accounting classification number.

3. Section C. The description or specifications of the work to be performed by the contractor, usually brief because it is also in the Statement of Work. May also cite laws or codes that the contractor must follow when performing the work.
4. Section D. Information on packing, packaging, and marking items to be delivered by the contractor.
5. Section E. Quality requirements for inspection and acceptance of contractor deliverables, and where the inspections will take place. Basically anything that impacts quality.
6. Section F. Information on time, place, and method of delivery or performance.
7. Section G. Administrative, accounting and financial information such as the type or color of money and how much of each type, addresses for payment or to resolve questions, the process for invoices, if there are special payment instructions, etc.
8. Section H. The Requirements Document can have many titles. For supplies, it may be termed Specifications or Circular of Requirements. For services, it might be a Statement of Work (SOW) or Performance Work Statement (PWS). Requirements defined broadly as objectives may be termed a Statement of Objectives (SOO). Specifications are often broken down by components or a work breakdown structure. Services are generally broken down by tasks. All requirements will usually have a general section and a more detailed breakdown. Often separate sections are created for applicable documents, government furnished property, quality standards, and acronyms.
9. Section I. A listing of contract clauses, most of which are required by regulations. They appear in short form here and usually require several pages.
10. Section J. A listing of attachments including Contract Data Requirements Lists (CDRLs), SOW, Security requirements, etc.
11. Section K. Usually not attached to most contracts, but sometimes contract clauses appear here, such as a contractor's certifications and representations for large/small business status, ethnicity, etc.

G. **Contract Data Requirements List (CDRL)**. A listing of all data items required for delivery to the Government by the contractor for a specific procurement. It consists of a series of DD Form 1423s (Individual CDRL forms) containing data requirements and delivery instructions. All data items listed in the CDRL are contractually binding deliverables implemented in the contract by a Contract Line Item Number(s) (CLIN(s)). The CDRL itself is attached to the contract and is referenced in Section J, List of Documents, Exhibits, and Other Attachments. CDRLs should be linked directly to SOW tasks and managed by the project office data manager.

H. **Contract Line Item/Contract Line Item Number (CLI/CLIN)**. A CLI is a short description of an item or service to be acquired in that contract. Each is identified separately from any other items or services on the contract and is identified by a CLIN. Each CLI contains a single unit price or a single total price, and has its own delivery schedule, period of performance, or completion date.

I. **Data Item Descriptions (DID)**. Defines exactly what data is to be delivered by the contractor, how it's to be prepared, the format it should be in, its intended use, and recommended delivery distribution.

J. **Statement of Work (SOW)**. A very detailed description of the work to be performed by the contractor. It shall contain, at a minimum, a statement of scope and intent, as well as a logical and clear definition of all tasks required. All SOWs should be performance based. A properly developed SOW tasks the contractor without telling him how to actually accomplish the task, leaving the contractor free to find creative and innovative solutions. The SOW normally consists of three parts:

(1) Section 1: Scope - Defines the overall purpose of the project and to what the SOW applies.

(2) Section 2: Applicable Documents - Lists references for applicable specifications and standards.

(3) Section 3: Requirements - States the tasks the contractor has to perform to provide the deliverables.

K. **Payments**. Payment to the contractor for goods and services is done in three ways, Lump Sum, Partial Payments and Progress Payments. Lump Sum is when the contractor is paid all of the money at once upon delivery and acceptance. Partial Payment is when all prices are itemized, each item is accepted individually, and payments made upon delivery. In this manner the contractor receives partial payment as each part is accepted and invoiced. Progress payments, used for more comprehensive efforts, are also sub-payments based on the work completed by the contractor, incurred costs, or performance based as specified milestones are met. Progress Payments do not incur the same interest penalties and are contingent on final acceptance by the Government.

L. **Contracting Officer's Technical Representative (COTR)**. A Government employee appointed by the Contracting Officer to provide technical or administrative assistance on a particular contract. The individual must attend COTR training and be certified. A COTR is usually a member of the project office, often a LEM or engineer. The COTR's tasks are usually not a full time duty. A COTR's responsibilities include making sure the contractor delivers all goods and services agreed upon and on schedule, that all directions to the contractor are in agreement with the terms and conditions of the contract, and awareness of all notifications of contract change from both the Government and the contractor.

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CHAPTER 9. THE CUSTOMER: WHO IS THIS GUY?

A. **The logistician's customer is usually the uniformed Coast Guardsman in the field**. But that customer can also be a civilian at Headquarters or any of the Coast Guard's activities, another branch of the Government (Navy, Army, etc.), or a foreign government. What is important is that the customer for that particular project is involved, a member of the team. Their requirements and input are critical to the success of the project. They are the equipment users, so they know what the equipment needs to do, under what conditions it will be used, how the users will operate it, shortcomings of existing equipment, and a variety of lessons learned from operator use of similar equipment. They are a knowledge library and should be utilized as much as possible.

B. **A certain amount of "buy-in" is necessary from the customer before the item is fielded**. The customer needs to understand what is being acquired, what it will do, how it will affect him, and that it was designed with his needs in mind. An acquisition can fail if the users do not accept it, therefore having them participate in the acquisition process makes acceptance easier. The customer is the ultimate reason for the acquisition.

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CHAPTER 10. POLICY: COMMANDANT INSTRUCTIONS

A. **Commandant Instructions and Manuals, known as policy documents, serve two basic purposes**. First, they assign responsibility for specific tasks, such as managing acquisitions, supervising ship overhauls, performing aircraft maintenance, buying spare parts, maintaining software or computer systems, and even developing and updating policy. Secondly, for certain narrow subjects, policy provides exact, specific processes that must be followed, or should be considered. For example, the Aeronautical Engineering Maintenance Manual, COMDTINST M13020.1 (series), describes the mandatory process to inspect each type of Coast Guard aircraft, and it must be followed unless a waiver has been granted. On the other hand, the Major Systems Acquisition Manual, COMDTINST 4150.2 (series) describes the required acquisition process for the Coast Guard, though many of the process steps are not mandatory, but "discretionary" (you make the call). This provides for an amount of flexibility allowing a more efficient and streamlined acquisition process.

B. **If a policy document is well written, it should show a clear chain of responsibility, list each step in a process, and state all aspects of a subject that need to be considered**. It should educate, and therefore help the user do his job better. For a list of logistics and acquisition instructions, see Appendix B.

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CHAPTER 11. ACQUISITION PLANS AND DOCUMENTATION DEFINITIONS

A. **An acquisition project is made up of people and paper**. The paper often comes in the form of specific plans and studies, each fulfilling a particular purpose in the overall acquisition process. The following is a list of some of these documents which are common to most projects.

1. Integrated Logistics Support Plan (ILSP). The key logistics document that describes how the item or system will be supported. It includes all ten elements of ILS, and its format is found in reference (b).
2. Project Management Plan (PMP). A document developed and issued by a project manager which shows all major tasks to be accomplished, in an integrated, time-phased format. It includes descriptions of resources required to complete the task.
3. Legacy Asset Management Plan (LAMP). Describes how current items (boats, cutters, aircraft, radars, etc.) will be upgraded, modified, or removed from service as new replacement assets are acquired.
4. Mission Needs Statement (MNS). A formatted, non-system-specific statement describing particular operational capability needs. Written in broad operational terms, it describes the required operational capabilities and constraints to be studied during the Concept Exploration and Definition Phase of the Requirements Generation Process.
5. Operational Requirements Document (ORD). A formatted statement containing performance and related operational parameters for the proposed concept or system (what the system is required to do in the field). It is prepared by the user or user's representative at each milestone.
6. Concept of Operations (CONOPS). A verbal or graphic statement, in broad outline form, of a commander's assumptions or intent in regard to how the system will be used, i.e., drug interdiction, bridge inspection, search and rescue.
7. System Performance Specification (SPS). Provides the minimum performance requirements for the item or system to be acquired, and explains the capabilities needed to perform the missions stated in the Mission Needs Statement.
8. Capstone Requirements Document (CRD). Contains general performance-based requirements which are used to facilitate the development of individual operational requirements documents. It provides a common framework and operational concept to guide their development.
9. Test and Evaluation Master Plan (TEMP). Documents the overall structure and objectives of the Test and Evaluation (T&E) project. It provides a framework within which detailed T&E plans are generated, and it documents schedule and resource impacts associated with the T&E project.
10. Work Breakdown Structure (WBS). A system oriented family tree composed of hardware, software, services, and data end items. Its purpose is to subdivide a complex project into smaller, more manageable units of work.

11. Specification (SPEC). A document used in development and procurement which describes the technical requirements for items, materials, and services, including the procedures by which it will be determined that the requirements have been met. Specifications may be unique to a specific project (project-peculiar) or they may be common to several applications (general in nature).

12. Request for Proposal (RP or RFP). A carefully written description of an item that needs to be built or a task that needs to be performed, in the format of a solicitation. It is used in a negotiated acquisition project and communicates government requirements to prospective contractors and requests proposals in return.

13. Delivery Task Order (DTO). A well defined sub-task within a contract that can be accomplished by itself. Contracts are often composed of several DTOs, each of which can be started and ended independently as the overall project progresses. A Delivery Order refers to supplies while a Task Order refers to services.

14. Environmental Impact Analysis. Documents the possible negative impact to the environment (pollution) that may occur during system design, development, testing, production, support, operation, maintenance, and disposal. It's used to minimize or eliminate damage to the environment by highlighting tasks that could be harmful, and then detailing a prevention solution.

15. Quality Assurance Surveillance. Planned and systematic actions or tasks necessary to provide management with confidence that good technical requirements have been established, that products and services conform to these requirements, and that satisfactory performance is therefore being achieved.

16. Technology Refreshment Plan. A process to periodically upgrade equipment with newer technology components. It is used to improve performance and help mitigate obsolescence.

17. System Safety Project Plan. The application of engineering and management principles, criteria, and techniques to optimize the safety of people interacting with the system, within the constraints of operational effectiveness, time, and cost throughout all phases of the system's life.

18. Human Factors Engineering Plan. The systematic application of relevant information about human abilities, characteristics, behavior, motivation, and performance in regards to the item or system being acquired. It includes principles and applications in the areas of human engineering, anthropometrics, personnel selection, training, life support, job performance aids, and human performance evaluation.

19. Level of Repair Analysis (LORA). A study conducted as part of the system/equipment engineering analysis process, to decide where an item or system will be repaired (unit level or at a depot).

20. Reliability, Maintainability, and Availability (RM&A) Project Plan. RM&A requirements placed on acquisition projects to ensure that the product acquired is operationally ready for use when needed, will successfully perform assigned functions, and can be economically operated and maintained within the scope of logistics concepts and policies.

21. Technical Manual (TM). A publication that contains instructions for the installation, operation, maintenance, training, and support of systems, system components, and support equipment. TM information may be presented in any form, including hard copy, audio and visual displays, magnetic tape, discs, and other electronic devices. A TM normally includes operational and maintenance instructions, parts lists or parts breakdown, and related technical information or procedures exclusive of administrative procedures.

22. Technical Data Package (TDP). A technical description of an item that is detailed enough to allow it to be produced by a manufacturer other than the original manufacturer. It consists of all applicable technical data such as Level III drawings, associated lists, specifications, standards, performance requirements, quality assurance provisions, and packaging details. The TDP defines the required design configuration and procedures to ensure adequacy of item performance.

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CHAPTER 12. YOUR TRAINING

A. **Professional Education**. To be an effective LEM, it is important to have a well-rounded knowledge of all aspects of logistics, which can be acquired through a variety of sources. Acquisition Logistics is a complex discipline and difficult to learn solely "on the job". As stated in reference (a), the following is a list of required and recommended training for the LEM. Since this document is a guide rather than an instruction, most classes can only be recommended. ACQ, CON and LOG 101 and 201 series classes are recommended, as they provide the foundation information for a LEM. The other classes provide specialty training for certain tasks a LEM might be required to do. Currently there is no direct requirement to take particular classes to qualify for promotion. The Defense Acquisition University (DAU) and the Defense Systems Management College (DSMC) provide classes at no cost, many of them online. Coast Guard policy allows these classes to be completed during normal office hours and on Government computers. Contracting Officer Technical Representative and Basics of Contracting are both C-Schools, and quotas should be sought through the Training Quota Management System. For those classes that are not online or part of the formal training system, LEMs will have to use office training funds to pay for travel and lodging expenses. Information on DAU and DSMC classes can be obtained on their combined website: http://www.dau.mil.

B. **Required Classes**

1. G-A-2 - Acquisition Process Training (provided by Commandant (G-A-2)).

C. **Recommended for all LEMs**

1. COTR Contracting Officers Technical Representative (DAU online)
2. ACQ101 Fundamentals of Systems Acquisition Management (DAU online)
3. LOG101 Acquisition Logistics Fundamentals (DAU online)
4. SAM101 Basic Software Acquisition Management (DAU online)
5. ACQ201 Intermediate Systems Acquisition, Parts A & B (DAU online and resident)
6. LOG201 Intermediate Acquisition Logistics, Parts A & B (DAU online and resident)
7. LOG203 Reliability and Maintainability (DAU online)
8. LOG235 Performance Based Logistics, Parts A & B (DAU online and resident)
9. BCF101 Fundamentals of Cost Analysis (DAU resident)
10. PQM101 Production, Quality and Manufacturing Fundamentals (DAU online)
11. CON101 Basics of Contracting (DAU online)
12. IRM101 Basic Information Systems Acquisition (DAU online)
13. SYS201 Intermediate Systems Planning, Research, Development and Engineering, Parts A & B (DAU online and resident)

D. **Additional Recommended Training From DAU**

1. BCF206 Cost Risk Analysis (DAU resident)

2. LOG204 Configuration Management (DAU resident)
3. LOG 304 Executive Life Cycle Logistics Management (DAU resident)
4. CON210 Government Contract Law (DAU resident)
5. BCF102 Fundamentals of Earned Value Management (DAU online)
6. BCF203 Intermediate Earned Value Management (DAU resident)
7. BCF211 Acquisition Business Management, Parts A & B, (DAU online and resident)
8. PQM203 Preparation of Commercial Item Descriptions (DAU resident)
9. TST101 Introduction to Acquisition Workforce Test & Evaluation (DAU online)
10. TST202 Intermediate Test and Evaluation (DAU resident)
11. SAM201 Intermediate Software Acquisition Management
12. SAM301 Advanced Software Acquisition Management

E. **Logistics Certification SOLE**. The Society of Logistics Engineers (SOLE) has a certification program designed to define and promote the professional stature and ethics of logisticians within commerce, industry, defense, federal and local government agencies, and both academic and private institutions. The title "Certified Professional Logistician" is granted by SOLE to individuals of proven competence in logistics who pass an examination designed to test their broad knowledge of the entire logistics spectrum. This certification is an excellent way to show professional knowledge and competence, and is highly recommended for Coast Guard LEMs and logisticians. Their website is: http://www.sole.org/.

F. **Coast Guard Logistics Certification Program**. The Coast Guard has an acquisition certification process of its own, through the Acquisition Directorate (G-A). Their SOP #3A details the process to obtain certification on http://cgweb.comdt.uscg.mil/g-a/. Requirements parallel those of DoD, and required classes are offered by the DAU.

G. **Logistics Certification DAU**. The DAU provides a certification program for three levels of expertise, Levels I, II, and III. Career paths covered under this program are Auditing, Business, Cost Estimating, Financial Management, Contracting, Facilities Engineering, Industrial/Contract Property Management, Information Technology, Lifecycle Logistics, Production, Quality and Manufacturing, Program Management, Purchasing, Science and Technology Management, Systems Engineering, and Test and Evaluation. Certification is mandatory for many DoD acquisition career paths. Their website is: http://www.dau.mil/catalog/Catalog%20Appendix%20B.pdf

H. **Graduate Degree Programs**. The Air Force Institute of Technology offers a Masters Degree in Logistics Science. It requires six (6) academic quarters of study and is a resident program at their Dayton, Ohio campus. Their website is: http://en.afit.edu/ens/degrees/glm.asp

APPENDIX A: INFORMATION ON ACQUISITION AND LOGISTICS

A. The following websites contain very useful information on acquisition and logistics, or provide more specific policy and processes related to acquisition:

1. USCG Office of Systems Logistics http://cgweb.comdt.uscg.mil/g-sl/gsl.htm
2. USCG Office of Acquisition http://cgweb.comdt.uscg.mil/G-A/
3. USCG Certification http://cgweb.comdt.uscg.mil/g-a/
4. USCG Office of Contract Support http://cgweb.comdt.uscg.mil/g-acs/AcqDepot/Tools/Tools.htm
5. USCG Office of Procurement Management http://cgweb.comdt.uscg.mil/G-CFP/g-cpm/procure/2001/HOMEPAGE/PROHOME.htm
6. DoD AT&L Knowledge Sharing System http://akss.dau.mil
7. Defense Acquisition Guide http://akss.dau.mil/dag/
8. Defense Systems Management College Library http://www.dau.mil/pubs/pubs-main.asp
9. Joint Chiefs of Staff http://www.dtic.mil/doctrine/
10. Defense Link (DoD pubs) http://www.defenselink.mil/pubs/
11. Navy LOGTOOLS https://www.logtools.navsea.navy.mil/index.htm
12. IPT Training http://osdipt.dynsys.com/understanding_ipts.html
13. COTR Training, Federal Acquisition Institute http://www.faionline.com/kc/login/login.asp?kc_identkc0001
14. The Seven Step Guide to Performance-Based Acquisition http://oamweb.osec.doc.gov/pbsc/index.html

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APPENDIX B: LOGISTICS AND ACQUISITION INSTRUCTIONS

A. The following is a list of logistics and acquisition instructions that explain in greater detail the information presented in this guide. All of these documents can be found on the Coast Guard's Directives website; http://cgweb.uscg.mil/g-c/g-ccs/g-cit/g-cim/directives/welcome.htm, or on the DoD's website; http://akss.dau.mil/jsp/default.jsp

1. System Integrated Logistics Support (SILS) Policy Manual, COMDTINST M4105.8 (series)

2. Major Systems Acquisition Manual, COMDTINST M4150.2 (series)

3. Long Range Planning of Logistics Support for Operational U.S. Coast Guard Cutters, COMDTINST 4105.4 (series)

4. Management of the Coast Guard's Training System, COMDTINST 1550.9 (series)

5. Development and Management of Interactive Courseware (ICW) for Coast Guard Training, COMDTINST 1554.1 (series)

6. Naval Engineering Manual, COMDTINST M9000.6 (series)

7. Electronics Manual, COMDTINST M10550.25 (series)

8. Coast Guard Configuration Management, COMDTINST 4130.6 (series)

9. Coast Guard Configuration Management for Acquisitions and Major Modifications, COMDTINST M4130.8 (series)

10. Coast Guard Configuration Control Boards, COMDTINST M4130.10 (series)

11. Coast Guard Configuration Management During Sustainment, COMDTINST M4130.9 (series)

12. Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1 (series)

13. National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts, COMDTINST M16475.1 (series)

14. Coast Guard Transition to the Metric System, COMDTINST 5711.2 (series)

15. Coast Guard Standardization Program, COMDTINST 4200.38 (series)

16. Coast Guard Acquisition Procedures Manual, COMDTINST M4200.19 (series)

17. Coast Guard Ombudsman Program for Agency Protests, COMDTINST 4200.14 (series)

18. Operation of the Defense Acquisition System, DoDI 5000.2 http://akss.dau.mil/dag/DoD5000.asp?view=document&doc=2

19. Acquisition Career Development Program, DoDD 5000.52-M http://www.dtic.mil/whs/directives/corres/pdf/500052mwch1_1195/p500052m.pdf

20. DoD Handbook – Acquisition Logistics, 30 May 1997, MIL-HDBK-502

21. Coast Guard Training System's Standard Operating Procedures (SOP)

22. DAU Life Cycle Logistics Management Community of Practice http://acc.dau.mil/simplify/ev.php?URL_ID=9914&ID2=DO_COMMUNITY

APPENDIX C. ACRONYMS

The following are commonly used logistics and acquisition acronyms.

AFC	Allotment Fund Control code
CANDI	Commercial and Non-Developmental Item
CDRL	Contract Data Requirements List
CLI.	Contract Line Item
CLIN	Contract Line Item Number
CM	Configuration Management
COMDTINST	Commandant Instruction
CONOPS	Concept of Operations
COTR	Contracting Officer's Technical Representative
CRD	Capstone Requirements Document
DDD	Detailed Design Data
DID	Data Item Description
DMSMS	Diminishing Manufacturing Sources and Material Shortages
DTO	Delivery Task Order
EIA	Environmental Impact Analysis
FAR	Federal Acquisition Regulations
FMS	Foreign Military Sates
ILS	Integrated Logistics Support
ILSMT	Integrated Logistics Support Management Team
ILSP	Integrated Logistics Support Plan
KDP	Key Decision Point
LAMP	Legacy Asset Management Plan
LCC	Life Cycle Cost
LEM	Logistics Element Manager
LORA	Level of Repair Analysis
LSA	Logistics Support Analysis
MIL-SPEC	Military Specification
MNS	Mission Needs Statement
ORD	Operational Requirements Document
PHS&T	Packaging, Handling, Storage, and Transportation
PMP	Project Management Plan
RDT&E	Research, Development, Test and Evaluation
RFP	Request for Proposal
RM&A	Reliability, Maintainability, and Availability
SOW	Statement of Work
SPEC	Specification
SPS	System Performance Specification
TDP	Technical Data Package
TEMP	Test and Evaluation Master Plan
TM	Technical Manual
WBS	Work Breakdown Structure